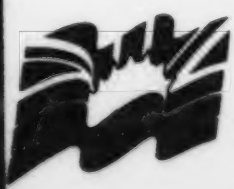
REPORT ON THE COWICHAN ESTUARY PLAN IMPLEMENTATION PROGRAM



Province of British Columbia

Ministry of Environment

AN ENVIRONMENTAL MANAGEMENT PLAN FOR THE COWICHAN ESTUARY

REPORT ON THE COWICHAN ESTUARY PLAN IMPLEMENTATION PROGRAM

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AN ENVIRONMENTAL MANAGEMENT PLAN FOR THE COWICHAN ESTUARY

1.0 INTRODUCTION

The Province of British Columbia's Environment Management Act empowers the Minister of Environment to prepare and publish environmental management plans for specified areas within British Columbia. Environmental management plans are intended to provide a framework for environmental decisions and to balance environmental priorities and concerns with those of other organizations and interests. The Cowichan Estuary is one area where such a plan is particularly needed. For several years, the demand for industrial use of the estuary has conflicted with the deep concern for adequate conservation of the estuary's resources expressed by both local citizens and environmental agencies.

In the early 1970's, Cowichan Bay was identified as a potential major industrial port. This prompted growing concern that further expansion of industrial use would cause unacceptable losses of the specialized fish and wildlife habitat the estuary provides. An intergovernmental task force was established in 1974 by the provincial government to address the issue. Four land use options were identified by the task force, ranging from complete preservation to full industrial dedication. The provincial government selected a status quo option which stipulated no further industrial expansion should occur in the estuary. It did allow for the re-establishment of an existing sawmill site by Doman Industries Limited.

Although development of the new sawmill in 1975 proceeded largely in accordance with government requirements, the company did not confine log storage for the mill to the 20 acre limit that had been mutually agreed upon in correspondence between the company and government. The

limit on the sawmill's log storage in the estuary was more than just slightly exceeded, often by many times the allotted acreage. This, combined with a number of new development proposals for the estuary, led to renewed debate over the scale of industrial use in the estuary and generated considerable distrust by the concerned public of government/ industry commitments in this regard.

The Cowichan Estuary Task Force was reconvened in 1978 to examine the issues involving various activities in the area and to recommend a land use plan for the estuary. The Task Force's report, released in late 1980, contained several key recommendations relating to flood control, log management and overall land use. Acknowledging the high values placed on the estuary for both fish and wildlife habitat and forest industrial activity, the task force report recommended a precautionary approach to dealing with technical uncertainties and future use of the estuary's resources.

In May, 1981, the British Columbia Ministry of Environment initiated a program to coordinate implementation of the task force's recommendations. From the outset, it was recognized that extensive negotiations with several key government agencies, the forest companies, and landowners would be required, together with public consultation. A Coordinator was appointed to lead the negotiations and an office was opened in Duncan to provide contact for the concerned public.

The Task Force presented four log management concepts which were felt to accommodate the respective needs of industry and habitat conservation in varying proportions. Nearly all the estuary is owned by Canadian National Railway and log storage areas are leased by CNR to each forest company. Therefore, it has been necessary to negotiate agreement with each leaseholder and the landowner on how their respective requirements can be appropriately balanced with the environmental objectives of relevant government agencies and the concerned public.

Much time and effort has been dedicated through the Cowichan Estuary Plan Implementation Program to negotiating agreement between the present industrial users of the estuary and the key government agencies responsible for regulating land and resource use. Efforts to consult and inform the general public and concerned groups and individuals have been made periodically. However, this did not include direct participation in negotiations and the details of the negotiations have been withheld to ensure their continuation.

The scale and nature of industrial activity in the estuary has remained a sharply divided issue and the views of each side have become firmly entrenched over the years. Despite its obvious necessity, the resistance to compromise has been a major barrier to reaching a broadly acceptable solution to the problem.

Fortunately, the negotiations have produced consensus. It is now possible to start fresh with an agreeable approach to present use of the Cowichan Estuary and a flexible framework for reaching future land use decisions. The needs of industry and other forms of economic activity in the estuary can be balanced with the conservation measures required to adequately safeguard the estuary's environmental resources and productive capacity. This report sets forth an environmental management plan designed to achieve the goal of balanced resource use in the Cowichan Estuary.

2.0 INDUSTRIAL/COMMERCIAL ACTIVITY

Forest industrial activity is predominant in the Cowichan Estuary with agriculture ranking second in terms of spatial use. Transportation and port activity are linked almost exclusively to the forest industry. Although the forest industry clearly dominates economic activity in the Cowichan Estuary, activity associated with agriculture, recreation, commercial fishing and marina services, hospitality and tourism, and residential development provides moderate diversification of the local economic base.

A great deal of local support exists for focussing further economic development in the estuary on tourism. This is partly out of the desire to reduce local reliance on the forest industry and partly in recognition of the promising opportunities provided by the estuary's natural attributes and its close proximity to major population centres. While provision must be made to ensure the continued viability of forest industrial activity in the estuary, concern has been expressed that this not preclude or unduly hinder the growth of tourism and recreation. In this respect, it is important to maintain sufficient open space in the estuary and enhance its natural attributes, as well as to improve and develop attractive tourist and recreational facilities. Figure 2.1 illustrates the existing spatial distribution of various industrial/ commercial activities in the Cowichan Estuary.

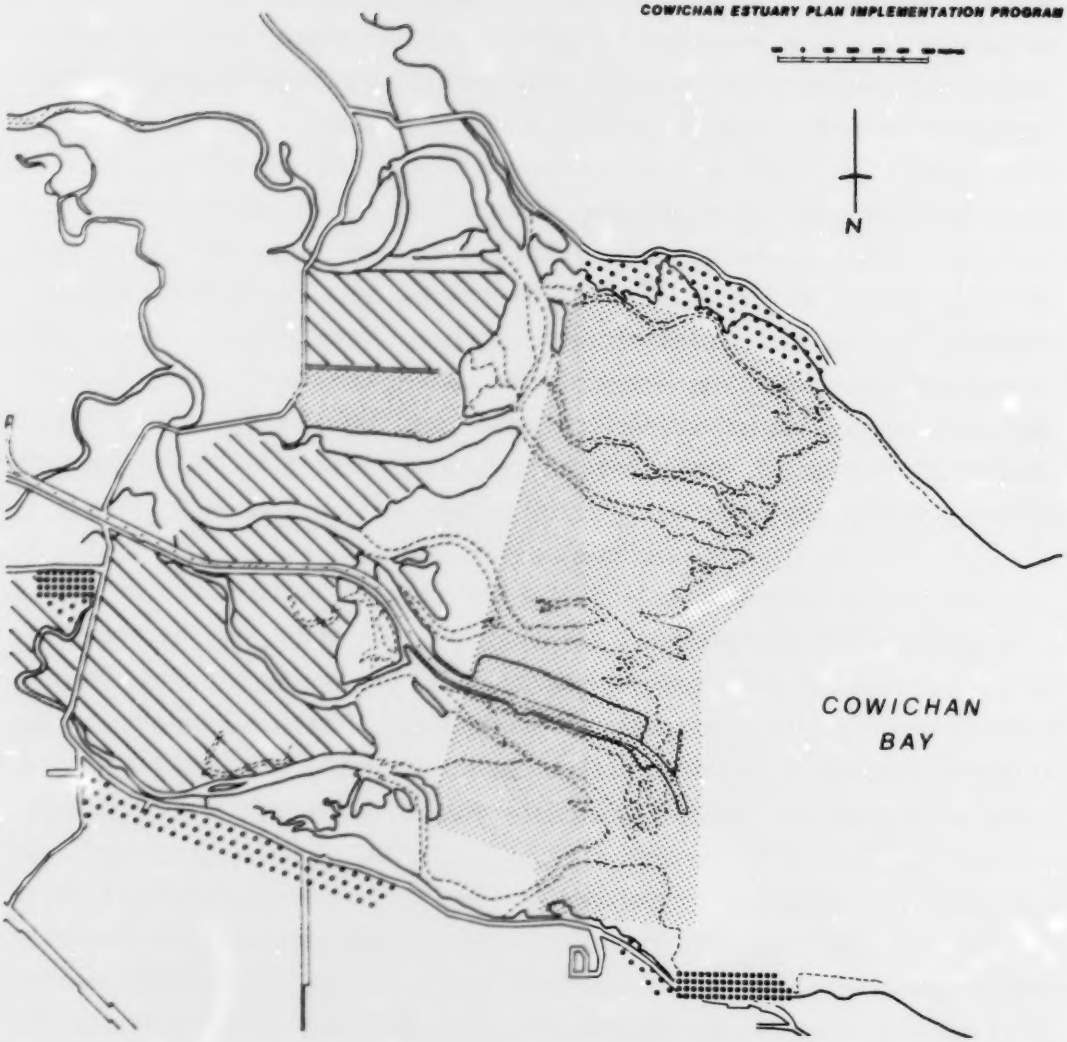
2.1 FOREST INDUSTRIAL/LOG STORAGE

The key forest companies presently operating in the estuary are British Columbia Forest Products (BCFP), Doman Industries (Doman), and MacMillan Bloedel (M-B). Canadian National Railway (CNR), which owns almost all of the intertidal portion of the estuary, leases log handling and storage area to each company. Westcan Terminals (Westcan) operates the lumber loading port facility which is accessed by truck along the private industrial haul road constructed by M-B, and by CNR's railway. While a variety of commodities are delivered at the Westcan/CNR dock,

FIGURE 2.1

Generalized Existing Uses

COWICHAN ESTUARY PLAN IMPLEMENTATION PROGRAM



Industrial

Agricultural

Commercial

Residential

the port facility operates chiefly for the storage and transhipment of lumber out of Cowichan Bay to other domestic and foreign destinations. A small specialty log sort and storage area is operated by Falt Towing on a sub-lease from Westcan. A small log dump, adjacent to BCFP's log-dump, has been leased to L & K Lumber and is used periodically by small companies or independent loggers.

Under present arrangements, almost half (49%) of the intertidal portion of the estuary is leased for log storage purposes. The operations of both BCFP and M-B involve dumping and sorting of bundled logs, assembly of log booms, and storage until the booms can be towed elsewhere. In contrast, logs are towed into Cowichan Bay and stored on the estuary to provide a sufficient inventory for supplying the Doman Sawmill. Figure 2.2 shows the various areas presently leased to each company for log storage.

Due to the unpredictable influences that variations in the forest product market and weather can exert on timber cutting and log transportation operations, the amount of the estuary used for log storage fluctuates widely. The need to account for fluctuating log storage requirements has been an important factor in determining the amount of area to be used by each forest company for log storage.

Another factor which relates to the need to use intertidal areas for storing logs concerns the damage to logs that can result from prolonged marine borer infestation. Storing logs which have become infested en route to Cowichan Bay in the intertidal area can reduce the rate of further damage by marine borers. Periodic exposure to air and significantly lower salinity occurring in intertidal areas reduces the feeding and reproductive rates of marine borers. Because the selling price of lumber showing damage by borers is substantially less than that of undamaged lumber, many forest companies are reluctant to give up intertidal log storage sites.

When negotiations on reducing intertidal log storage commenced under the Cowichan Estuary Plan Implementation program, the forest companies were critical of the log management concepts presented in the Task Force report. Although each company had criticisms specific to its own circumstances, there were some faults in the log management concepts which all found in common. Each maintained that the amount of storage area allocated in the log management concepts would have been more realistic if the forest companies had been given the opportunity to participate directly in formulating the concepts. It was also felt that the areas assigned to each approximated the average needs of each company, but did not adequately take into account periods of peak storage caused by the weather and market variations mentioned previously. Another very significant concern related to questions the companies had about the severity of environmental impacts attributed to intertidal log storage and used to justify the scale of reduction in log storage called for in the Task Force report.

All of the above factors, especially the very basic issue relating to the environmental impacts of intertidal log storage, have had to be addressed in negotiating acceptable log management arrangements for the Cowichan Estuary. The approach taken by the Implementation Coordinator was to ask each forest company to produce its own figures for log storage requirements, based on peak storage needs rather than average needs. Using the companies' figures, the next step was to determine how much of the total storage required could be shifted from intertidal to deep water sites. The reasoning involved is that substantial reduction of intertidal log storage can be accomplished, while still providing sufficient storage area for each company's needs, by shifting a proportion of the overall log storage into suitable deep water sites. The difficulty with this approach has been finding suitable deep water sites, and especially, reaching agreement on what proportion of required storage area will remain located on the intertidal zone of the Cowichan Estuary. Finally, specific agreements have been reached with each company and are described in the following sections.

2.1.1 British Columbia Forest Products

BCFP's main objection to the Task Force report was the proposed elimination of its in-transit log storage area on the north side of the estuary. This area of approximately 50 acres has been used by BCFP to store logs destined for the company's mills in the Lower Mainland and Victoria. Some of the logs stored there have been dumped and boomed in Cowichan Bay, while others have been towed from other log dumps to Cowichan Bay en route to one of BCFP's mills. This is why the term, in-transit, has been used to describe the storage area. Figure 2.2 shows BCFP's existing log storage lease areas.

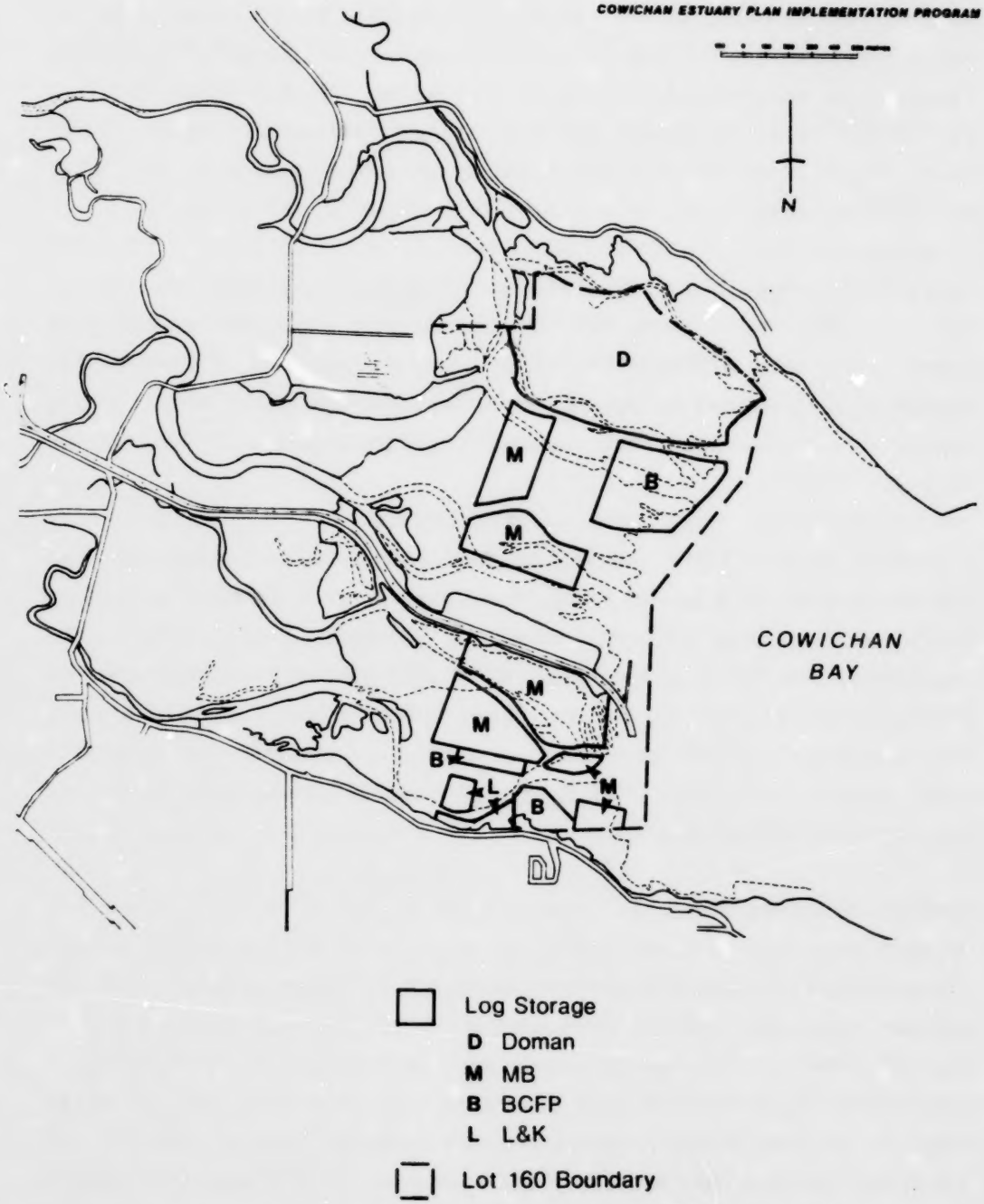
The Task Force felt that in-transit storage should not occupy intertidal areas. Accordingly, the Task Force proposed that BCFP's intertidal log storage be restricted to the area surrounding its log dump on the south side, and to a small (5.8 ac.) area north of the causeway, as these were viewed by the Task Force as being vital to BCFP's continued operations in the estuary. However, BCFP also considered the in-transit storage to be vital to its overall operations and, with this in mind, together with the objectives presented in the Task Force report, BCFP suggested an alternative approach.

Even before the Task Force report had been released in 1980, BCFP recognized that reduction of log storage in the estuary would be required. To reduce the total area needed for storage, BCFP converted entirely to bundle boom dumping and storage, which requires about half as much area as the flat raft storage method for the same volume of logs. BCFP also shifted its in-transit storage area on the north side seaward and reduced it from 67.2 acres to 43.9 acres. They also cancelled an additional 15.7 acres of seldomly used log storage leases in the upper intertidal area on the south side of the estuary. All of these measures resulted in BCFP's log storage areas in the estuary being reduced from roughly 105 acres to 65 acres.

FIGURE 2.2

Present Log Storage Leases

COWICHAN ESTUARY PLAN IMPLEMENTATION PROGRAM



Log Storage

D Doman

M MB

B BCFP

L L&K

Lot 160 Boundary

Having already made the changes described, BCFP suggested that further reduction of its intertidal log storage area could be achieved, without eliminating its in-transit storage, by "flipping" the present storage area on the north side into deep water. This proposal entailed use of the existing row of dolphins as the new landward edge of the storage area with the deep water end secured by a system of can buoys and anchors.

BCFP's proposal was found to be acceptable. It has been agreed that BCFP will shift its in-transit storage into a 30 acre area of deep water immediately adjacent to its present storage area. The new log storage site is shown in Figure 2.3 which displays all of the new log storage areas that have been agreed upon through the Implementation Program.

As a result, BCFP's intertidal log storage area in the Cowichan Estuary will be reduced further by nearly 50 acres. As soon as a lease is issued for the portion of the storage area that would extend into Crown foreshore (by about 8 acres), BCFP will relocate its log booms to the new site. The company has indicated that it may not be able to make the necessary capital expenditures to fully utilize the new site immediately. Until then, BCFP intends to use only that area of the new site adjacent to the dolphins.

2.1.2 MacMillan Bloedel

Some of the assumptions used by the Task Force to derive the log storage reductions for M-B were challenged by the company. M-B felt that the effects of large market swings and the need for above average capacity during periods of peak demand had not been sufficiently recognized in the Task Force's recommendations. Rather than the 45 acres of intertidal storage recommended by the Task Force, M-B proposed to retain an area of 67 acres. M-B presently leases about 122 acres as shown in Figure 2.2.

Another major point raised by the company was that reduction of log storage in the Cowichan Estuary should not be considered in isolation, as the effects of the reduction would be felt in other operating sites where there also has been pressure to reduce log storage. Consequently, M-B has been willing to negotiate reduction in Cowichan log storage only in context with its broader operational requirements.

Although it has seldomly used a 48.7 acre log storage lease on the north side of the causeway, M-B has wished to retain the area pending the outcome of log storage reduction negotiations at other M-B operations along the coast. As a hedge against possible future need for additional storage in the Cowichan Estuary to offset losses of storage areas elsewhere, M-B has been unwilling to relinquish the 48.7 acre area outright, without some compensating measures in return.

Several different approaches have been taken with M-B in the negotiations under the Implementation Program. At one point, attempts were made to link reduction of M-B's Cowichan log storage with settlement of log storage disputes M-B was having with government environmental agencies at Kelsey Bay, Buckley Bay and Namu Bay. This approach proved to be far too complicated to produce any reasonable progress. Consideration was also given to a scheme whereby M-B could use a number of temporary log dump sites along the northern coast of Galiano Island. However, further action on the scheme was suspended by the company.

Agreement eventually was reached with M-B under the Implementation Program for cancellation of their 48.7 acre lease on the north side of the estuary. Intertidal log storage for M-B will remain located within their present lease area of 67.4 acres on the south side of the estuary, of which a 10 acre strip along the landward edge of the lease will be set aside exclusively for barge access . A small (4.3 acres) boom storage area located in deep water at the southeast corner of the estuary will continue to be used by M-B as a storage site for log booms

imminently due for shipment elsewhere. As a result, M-B's intertidal log storage in the Cowichan Estuary will be reduced to 57.4 acres, as shown in Figure 2.3.

M-B's agreement to reduce its intertidal log storage has been contingent upon federal and provincial approval-in-principle of its proposed alternative haul road to Cowichan Bay. Of the 4.3 acres holding area just described, 2.1 acres occupy provincial Crown foreshore for which federal and provincial approval of the necessary lease also was a condition of M-B's agreement. At this time, M-B does not have any immediate plans to proceed with construction of the road, nor has a bridge yet been designed for the crossing of the Koksilah River. The location of the proposed haul road is indicated in Figure 2.3.

When submitted, final approval for the proposal will be subject to the bridge design and road construction plans meeting government environmental requirements. Concerns have been identified respecting possible impacts on the Koksilah River associated with bridge construction, complications to existing flooding problems, and the possible loss of two large maple trees. Nevertheless, it is expected that M-B could construct the road without significant environmental impact using appropriate precautions.

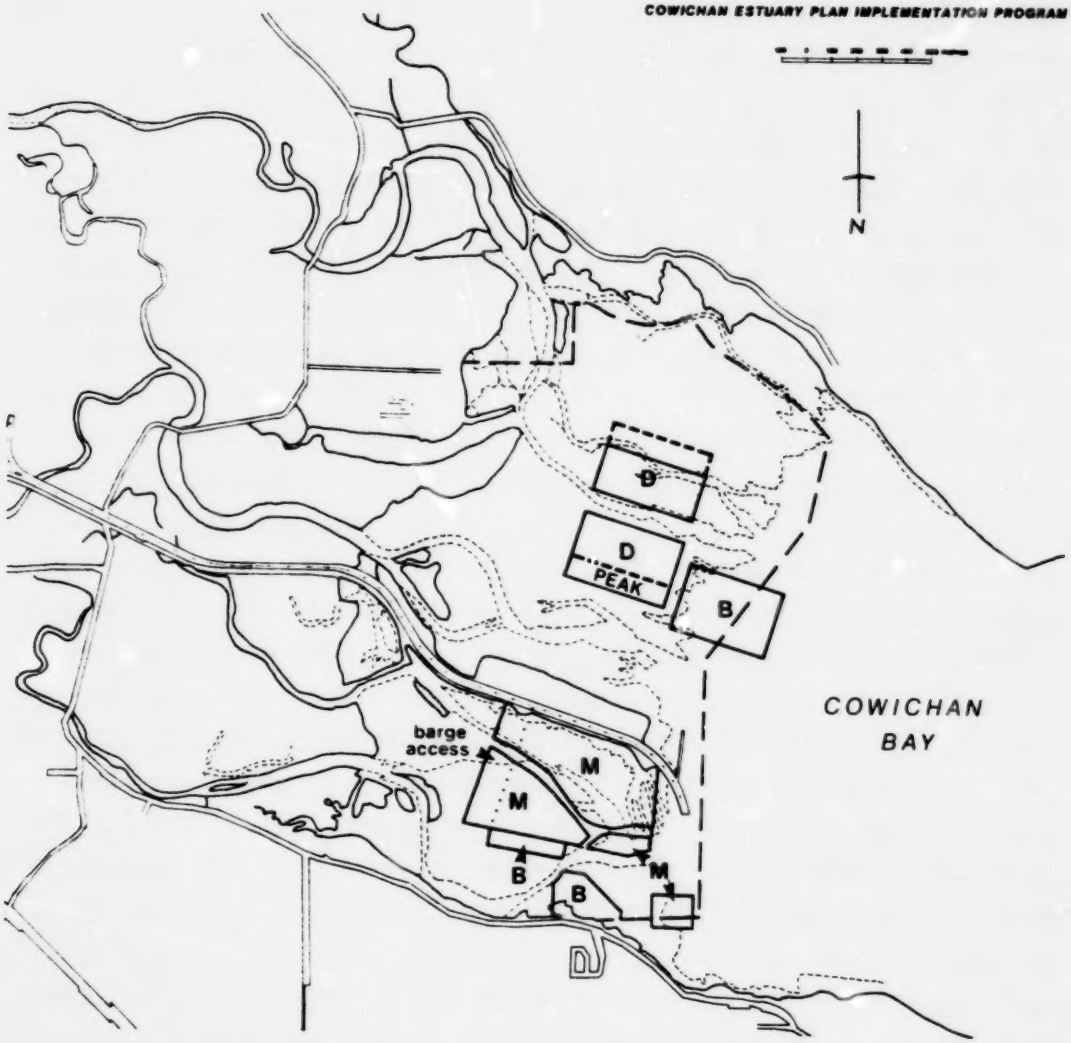
2.1.3 Doman Industries

Doman has been the focus of most of the controversy concerning log storage in the Cowichan Estuary. As the most recent industrial user to locate in the estuary, the attention of the local public concerned over the issue of industrial use in the estuary has been directed at Doman much more than at M-B or BCFP. However, the most significant factor

FIGURE 2.3

New Log Storage Leases

COWICHAN ESTUARY PLAN IMPLEMENTATION PROGRAM



Log Storage

D Doman

M MB

B BCFP

Potential Expansion

Lot 160 Boundary

contributing to Doman's apparent notoriety locally has been the company's continuous defiance of what it feels have been onerous and unworkable government requirements to confine its log storage to the 20 acres stipulated when government approval was given in 1975 for the sawmill to operate in the Cowichan Estuary. Consequently, the conflict over log storage in the estuary has become as much an issue of how much retribution Doman deserves for such past actions as how much Doman's log storage should be limited for environmental protection reasons. Together with governments' seeming reluctance to answer the call for swift and full enforcement of the original 20-acre log storage restriction for Doman, this has deeply disturbed and frustrated the Cowichan Estuary Preservation Society, a well-organized public group which apparently represents a significant number of likewise concerned citizens.

The four Log Management Concepts presented in the Task Force report differ primarily in relation to proposed modifications to Doman's existing operations. Concepts 2, 3 and 4 all called for a limit of 20 acres of intertidal log storage supplemented with 15 acres of dryland log storage at the mill site. As this arrangement essentially matches the original government restrictions on Doman's log storage set forth in 1975, the Task Force's log management analysis and recommendations served to reinforce the initial government decision on the opening of Doman's sawmill in the estuary.

The federal Minister of Fisheries and Oceans and the provincial Minister of Environment announced their approval-in-principle of the Task Force's proposed land use plan and endorsed pursuing negotiations to implement Log Management Concept 2. Accordingly, negotiations under the Implementation Program started by aiming to achieve the objective of limiting intertidal log storage for the Doman sawmill to 20 acres.

Doman discounted Concept 4 as being economically and operationally impractical, and also had problems accepting Concept 2. The Company felt that its own projected cost of $2.3 million for installing dryland

storage could not be afforded due to the recession in the forest industry. Moreover, even if dryland storage could be installed, Doman found 20 acres of intertidal storage to be unacceptable in view of its operational needs for sufficient storage to protect a portion of its log inventory that may be unmarketable for extended periods of time. There are numerous and complicated variables which can affect log supply for the Doman sawmill. Rather than attempting to convince Doman that the log storage figures and operational methods proposed for its mill by the Task Force were more sound than its own, the Implementation Coordinator suggested any log storage additional to 20 acres be located in deep water.

Together with an explanation of its log storage requirements, Doman submitted a proposal for reducing intertidal log storage based on use of deep water storage sites. The proposal was phased to allow for the advent of dryland storage, once sufficient financial resources become available to the company. As the first phase, Doman proposed 50 acres of intertidal storage, which included an allowance of 10 acres for peak storage periods, with the additionally required 85 acres to be located in deep water. Upon installing dryland storage, which would eliminate the need for 30 acres of "wet" storage, Doman proposed to reduce intertidal storage to 40 acres and deep water storage to 65 acres. The reason given by the company for not reducing intertidal storage to 20 acres was that such a limit would not provide sufficient flexibility either against large or sudden swings in market demand for certain kinds of lumber or for protection against marine borers under conditions requiring abnormally prolonged storage of certain logs.

At this point in the negotiations, a two-day Open House was held at the local community centre to invite public comment and suggestions on the proposals received from Doman, MB and BCFP. A full spectrum of opinion was expressed, ranging from the desire for all industry to be phased out of the estuary to calls for more industry to create more

jobs. Along with the Cowichan Estuary Preservation Society, some individuals felt that any arrangement short of enforcing the original 20-acre log storage limit for Doman would be unacceptable. The majority favoured some level of reduction in log storage on the estuary from the current situation.

However, there was unanimous opposition to the proposal that the 120 acres of deep water storage needed for both Doman and BCFP be located in the immediate vicinity of Cowichan Bay. The opposition was based on the adverse effect people perceived the proposed sites would have on present and future recreation and tourism in the Bay, although some were also opposed on environmental grounds. Considerable opposition to dryland storage at the Doman mill site also was expressed by some Cowichan Bay residents who are already disturbed by the existing noise levels generated by industrial activity in the estuary.

As a result of the Open House and public opinion received prior to it and since, it became clear that any reductions of intertidal log storage through relocation into deep water would require a location outside of Cowichan Bay. Likewise, relying on the eventual use of dryland log storage by Doman to offset present intertidal log storage needs appeared to pose more problems than solutions.

It was several months before a deep water log storage site acceptable to Doman could be found outside of Cowichan Bay and within reasonable towing distance. Doman has been pursuing acquisition of the site independently. In the meantime, certain improvements to its mill operations have been undertaken by Doman.

The contribution to the erosion of Mariners Island caused by the towing of log booms into the mill pond has concerned the Cowichan Estuary Preservation Society (CEPS) for some time. Mariners Island is situated on the south side of the mill pond. It is provincial Crown land accessible only by water as there is private property landward of

the island. Piling was installed around the tip of the island as well as along the south side of the mill pond and for a distance along the access channel approaching the mill pond entrance. The piling has since served to prevent log booms from grounding on the island or scraping against the tip of the island as they are towed into the mill. It also has made it easier for tow boats to navigate up the access channel during adverse conditions.

Early in the Implementation Program, Doman dedicated to the Ministry of Environment 17 acres of intertidal marsh the company owned seaward of the mill site and the adjacent farm. Through this dedication, Doman demonstrated to all concerned that there were not any plans or intentions to develop the dedicated lands for industrial purposes.

The farm immediately north of the sawmill is also owned by Doman and for the past several years has been operated as a dairy farm by A. Blackley on a lease from Doman. The seaward end of the farm is poorly drained and often has been subject to salt water intrusion. Although in its present state this area of the farm has some agricultural capability, it does offer considerable potential for developing intertidal habitat. Consequently, negotiations were undertaken with both Doman and the farmer on possible options for also acquiring portions of the farm for habitat management purposes. Acknowledging the potential habitat values, and to fulfill a 1975 commitment to replace marsh area used for constructing the sawmill, Doman offered to dedicate approximately 7 acres of the farm.

Habitat capability analyses conducted by the Ministry of Environment in cooperation with associated organizations indicated that the acquisition of approximately 25 acres of the lower portion of farm offered the highest potential for developing and managing habitat. However, as the habitat development potential is based on breaching the existing seaward dyke to allow for the influx of tidal water, flood protection to the remainder of the farm has been included in the proposal.

The existing dyking system around the farm is in poor condition and along the seaward end has been breached by winter storms for the last few years. The dyke along the north edge of the property providing protection from river flooding also is susceptable to failure unless extensive restorative work is undertaken. Ministry of Environment engineers identified a possible new dyke alignment which would afford a high standard of flood protection to the farm on all sides while still allowing for approximately 23 acres to be available for habitat management.

Doman eventually agreed to dedicate a total of 23 acres of the farm to the Ministry of Environment provided the costs of the dyke protection and other necessary surveys and works are borne by the Province. The two key habitat agencies involved, Ministry of Environment and Fisheries and Oceans Canada, have supported the negotiations with Doman to acquire the land and anticipate many worthwhile benefits to result from the estimated $200,000 cost of dyke protection.

The proposed dyke is consistent with the overall flood control plans for the Cowichan River. In order to maintain the farm as a viable unit, it is probable that similar flood protection would have to be undertaken in the future. Moreover, the creation of about 23 acres more intertidal marsh habitat for fish and wildlife can offset much of the damage to the intertidal mudflat area which will continue to be used for log storage by Doman. This and other habitat management projects also can offset some of the past loss of estuarine habitat from development in the estuary.

The land dedication and the location of deep water storage outside of Cowichan Bay have been instrumental in leading to agreement between the involved federal and provincial government agencies and Doman on a final arrangement for that company's log storage and continued operation in the Cowichan Estuary. The arrangement that has been accepted is for

40 acres of intertidal log storage, with an additional 10 acres to be set aside for periodic use during peak log storage conditions. The log storage areas will be located on both sides of the existing access channel to the Doman sawmill as shown in Figure 2.3.

It has also been agreed that, in the event Doman installs new facilities at the mill site to increase the capacity of the sawmill above the present 595,000 cubic meters of wood per year, there will be a proportional increase in intertidal log storage by a maximum of 10 acres. This accounts for unforeseen factors that may come into play in the future, and also establishes an upper limit of 60 acres intertidal log storage for the Doman sawmill. However, the above acreages do not account for the installation of dryland log storage at the mill site. If Doman installs dryland storage facilities, its intertidal log storage will be reduced by 10 acres and its deep water storage will be reduced by 20 acres.

For the time being, Doman's log storage in the estuary will be limited to 50 acres, which includes the 10 acres reserved for peak log storage. This change is to be brought into affect by the company by the end of 1984. It remains to be seen whether the company will take the necessary measures to increase the sawmill's lumber production capacity. As mentioned previously, the high capital costs of installing dryland storage, combined with the anticipated opposition to the attendant noise impacts that can be expected from other local property owners, may forestall indefinitely such a modification to the sawmill's operations.

Doman has indicated that installation of a bundle-lift may be proposed to improve the flow of logs into the sawmill from the mill pond. A small lumber loading dock was recently constructed within the mill pond to permit the periodic shipment of lumber by barge directly from the sawmill to the Lower Mainland. However, Doman maintains there are no longer any plans to undertake the scale of expansion of its industrial facilities in the Cowichan Estuary that at one time had been

considered, such as developing a pulp mill. Any structural improvements to the present sawmill will be situated within the present sawmill site.

Maintaining the existing access channel is a particular aspect of Doman's operation requiring further attention by the company. Doman has agreed to maintain access via the channel based on tidal aid. However, shoaling is presently occurring on the opposite side of the tip of Mariners Island making the entrance to the mill pond rather narrow. The upstream orientation of the Cowichan River points directly at the tip of the island. As flow shifts at nearly right angles away from the island toward deep water at that point, the deposition of sediments carried by the river's flow occurs along the inside curve of the bend in the channel.

This pattern can be expected to continue as long as the channel remains in its present position. For this reason, spot excavation of material from the shoaling area might produce only short-term widening and deepening of the access channel at the entrance to the mill pond. It has been recommended to Doman that it consult a hydraulic engineering firm to examine various methods by which continued use of the existing access channel by tidal aid can best be ensured over the long term.

2.1.4 L&K Lumber

The L&K site, shown in Figure 2.2, has seldomly been used by the company. However, small contract logging firms and independent loggers have used the site periodically for dumping and storing logs. Available log dump sites which are not controlled by the major forest companies are very scarce in the region.

Last year, Inland Log Brokerage Ltd. proposed to develop the site as a dryland sorting area and log dump, which could partly satisfy the local demand for a site accessible to independent operators. The proposal was later withdrawn. The site itself is a poor location for

such a facility. Its proximity to one of the Koksilah River channels and the limited periods when there would be deep enough water are examples of some of the operational and environmental constraints associated with the site. However, the demand for such facilities and the need to identify acceptable sites still remains.

Agreement between CNR and L&K to cancel the lease for the site has been reached. Future use of the area for industrial purposes should not be considered, as major modifications to the site would likely be necessary. The Cowichan Valley Regional District (CVRD) has indicated that the site could possibly be used as a road-side stopping area for visitors to Cowichan Bay. Other proposals for use of the site for purposes other than log storage might also be presented in the future. In the meantime, with the cancellation of the L&K log storage lease, 13.5 acres less of intertidal area are being used for log storage.

2.1.5 Falt Towing

Falt Towing provides towing services to Doman as well as to other clients. In conjunction with its towing business, Falt operates a small log sorting and storage area (6.0 acres) on a sublease from Westcan Terminals. The site is located immediately north of the existing terminal area. Falt periodically provides specialty log sorting services to Doman and other forest companies.

As long as activity is confined to the 6.0 acres area, continued use of the area for sorting and storing logs is considered to be acceptable. However, as discussed in the following section, any future expansion of the present terminal area may preclude the continuation of the Falt log storage area.

Summary

Negotiations under the Implementation Program have achieved a substantial reduction in log storage on the Cowichan Estuary. While it has not been possible to obtain agreements on implementing the log management concepts recommended by the Task Force, the agreements that have been reached come very close to the objectives set by the Task Force. Table 2.1 provides a comparison of the reductions from present log storage acreages called for by the Task Force with those achieved under the Implementation Program. The negotiated agreements will result in the amount of intertidal area in the estuary occupied for log storage being reduced from 49% to 19%. This does not include the 23 acres of habitat to be created from the land dedicated by Doman. This amounts to a 61% reduction in available log storage area on the estuary, as compared with the 68% reduction that would have resulted had it been possible to implement the Task Force's Concept 2.

There is one element of the negotiations has only been alluded to thus far, but has been central to the issue concerning use of the estuary for log storage. There still remains a significant question relating to the degree or severity of adverse impacts on estuarine resources that can be attributed to log storage on the Cowichan Estuary. Research has shown that log storage does physically damage estuarine habitat. Areas where logs have compacted sediment or smothered vegetation can be easily observed. However, the severity of the consequences resulting from such damage depends upon specific circumstances.

Consider the question of whether or not the reduction of certain invertebrate prey species that might otherwise dwell in areas undisturbed by log storage will significantly impair the likelihood and ability of juvenile fish to rear and develop in the estuary. A lot depends on the availability of other prey species upon which these fish may also feed and which drift around the estuary with the tide or river flows. These alternative feed sources are not affected adversely by log storage. Similarly, the problems that can result from the accumulation of wood fibre and debris are far less significant in areas well-flushed by river or tidal currents than in areas where water circulation is low or infrequent.

TABLE 2.1
COWICHAN ESTUARY - INTERTIDAL LOG STORAGE LEASES[1]

LESSEE	PRESENT	AGREEMENTS	TASK FORCE CONCEPT 2
Doman Industries	128.0 acres (north of causeway)	50.0 acres[2] (80.0 in deep water) (23 acres of intertidal to be created)[3]	20.0 acres (15 acres dryland storage)
B.C. Forest Products	16.3 (11.7 + 4.6) (south side)	16.3	22.1
	49.7 (43.9 + 5.8) (north side)	0 (30.0 in deep water)	
MacMillan-Bloedel	73.0 (67.4 + 5.6) (south side)	57.4	44.6
	48.7 (north side)	0	
L&K Lumber	13.5 (south side)	0	13.5
Falt Towing (sublet by Westcan)	6.0	6.0	6.0
TOTALS	335.2	129.7 (61% reduction)	106.2 (68% reduction)
% Intertidal Occupied	49%	19%[3]	16%

[1] Total acreage available by lease; not always in use.

[2] 40 acres plus 10 acres of periodic peak storage. May increase to a maximum of 60 acres if company increases mill capacity.

[3] Intertidal area of estuary estimated at 685 acres. To obtain % occupied after agreements, 129.7 is divided by 708 (685 + 23) = 18%.

Information relating to the above factors affecting estuarine ecology which is presently available for the Cowichan Estuary provides cause for concern but cannot be considered to be conclusive. More particularly, a definitive answer as to how much loss in fish production in the estuary can be directly attributed to each acre of log storage does not exist and is extremely difficult, if not impossible to provide. One cannot yet prove, for example, that 40 acres of log storage would cause unacceptable loss of fish productivity and that 20 acres would not. In the absence of an irrefutable technical solution to uncertainties relating to the environmental impacts of log storage in the Cowichan Estuary, careful and reasoned judgment has been called for in deter-mining continued and future land use of the estuary.

The Cowichan Estuary Task Force recommended a precautionary approach in presenting its proposals for use of the estuary. Industry and landowners of the estuary have now indicated their preferences in light of the Task Force's objectives, as have members of the public. There being both common ground and disagreement among all of these views on use of the estuary, the only positive approach to reaching a lasting solution which most people can generally accept has been through cooperation, flexibility and negotiation. The log storage agreements achieved through negotiations under the Implementation Program have produced an acceptable blend of measures that ensure sufficient conservation of the estuary's environmental resources as well as the continued viability of economic activities occurring in the estuary.

Certainly there has been cause in the past to doubt the level of commitment on the part of industry and government alike to resolving the conflict over use of the estuary, or even a willingness to try resolving the conflict; if the amount of time it has taken is any measure. Therefore, it may be natural for some people to wonder how long those in government and industry will remain committed to the agreements reached under the Implementation Program. The fact that steps to resolve past conflicts have been negotiated and mutually derived, rather than

imposed, should do much to ensure continued commitment. The fact that the objectives and needs of both sides of the past dispute have been accommodated with reasonable satisfaction also should help.

However, to more tangibly demonstrate the commitment each party in the negotiations holds with respect to the resulting arrangements, written and formal agreements between each of the major forest companies, and the Ministry of Environment, and the Department of Fisheries and Oceans Canada have been prepared and duly executed. These are essentially agreements in perpetuity specifying the modifications to each company's operations in the estuary and fortifying each party's commitment to abide by the arrangements negotiated.

2.2 PORT INDUSTRIAL

Canadian National Railway (CNR) holds ownership of Lot 160, which contains approximately 731 acres and comprises nearly all of the Cowichan Estuary, CNR's main interest in the land since receiving Lot 160 by Crown grant has been its use for port activity relating to its railway line. The existing facility operated by Western Terminals is dedicated to serving the forest industry. Accordingly, CNR has also leased much of Lot 160 to forest companies for log storage.

CNR has indicated willingness to deal with the lessees to cancel or reduce the size of the various log storage leases, in keeping with reasonable consideration of environmental concerns. However, for whatever modification being requested, CNR has sought assurances that the changes proposed have been mutually agreed upon by the companies and government agencies involved.

With a view to the long term, CNR believes that eventually there may be an increased demand for forest product shipping facilities in Cowichan Bay sufficient to warrant expansion of both the present dock

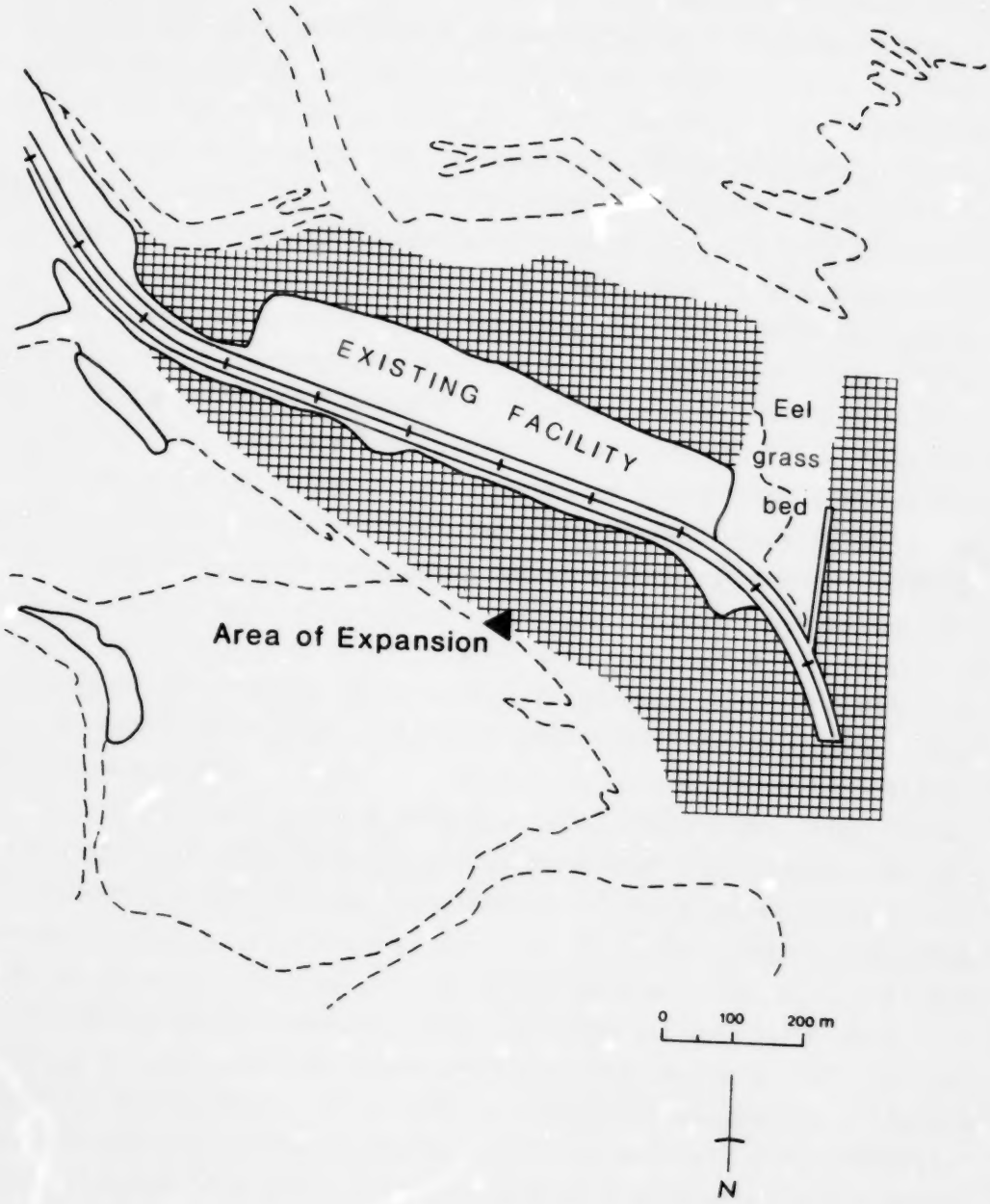
and back-up land. For this reason, CNR wishes to reserve up to 250 acres of the estuary for possible port-related development in the future. Not all of this area would necessarily be filled for additional back-up land as some would be required to provide expanded berthing and ship loading facilities. It also is conceivable that the increased demand required to stimulate expansion of the Cowichan Bay port facilities may not occur for many years, if at all. Figure 2.4 shows the present port facility and possible expansion area.

If expansion of the present port facilities is required, CNR expects that the construction of expanded facilities can proceed in such a way as to avoid substantial loss of the estuary's environmental resource values. CNR anticipates that through the guidance of government environmental agencies, the expanded port could be designed and construction scheduled so as to minimize environmental impacts, as well as offset some of the residual habitat losses resulting from expansion of the port area. As an example, CNR has pointed to the growth of eelgrass which has occurred immediately between the present back-up land and the northern end of the ship berthing dock. The absence of disturbance to the area has resulted in the site becoming the best area of eelgrass growth in the estuary at present.

CNR has sought approval by the responsible government agencies of their plans to proceed with port expansion when needed, subject to CNR meeting appropriate environmental requirements. In return, CNR has offered to set aside the remaining area of Lot 160 not leased for industrial purposes to support conservation of fish and wildlife habitat and compatible recreation. Although this would mean that initially CNR would not lease out the vacant portions of Lot 160, the company is willing to consider requests for leasing or providing other forms of tenure to habitat agencies or organizations having specific habitat management plans. For example, this could be in recognition of the need for sufficiently secure tenure in situations where the allocation of efforts and funding to undertake habitat enhancement projects is proposed.

FIGURE 2.4

Potential Port Expansion



Being the most directly involved major landowner in the estuary, CNR's agreement to modify existing industrial leases and its accept-ance of the land use arrangements negotiated under the Implementation Program have been essential. Accordingly, a written agreement between CNR, the Ministry of Environment and Fisheries and Oceans Canada also has been prepared. The agreement signifies each party's acceptance of the present plans for use of the estuary, as well as commitment to continued cooperation in reaching decisions relating to possible changes in the future that cannot be foreseen at this time.

2.3 AGRICULTURE

Large tracts of the former floodplain and intertidal zone of the Cowichan Estuary have been dyked, drained and cultivated for agriculture. In the area seaward of Tzouhalem Road (Figure 2.1), agricultural activity has been primarily associated with beef and dairy cattle production. There also has been a small amount of mixed fruit and vegetable production.

Although there is potential for more intensive agricultural use of these areas, agricultural activity in this part of Cowichan Bay has declined in recent years. The soils and climate in the area are well suited for agriculture. Sufficient drainage and flood protection are the most significant factors affecting the viability of agriculture in Cowichan Bay, apart from the economic factors relating to production and marketing.

One of the most immediate threats to the existing farms is the hazard of river flooding and salt water inundation. While some of the flood hazard can be attributed to the overall flood control problems upstream of the Cowichan Bay farms, the dykes surrounding the farms are quite old and substandard in many locations along their length. Unless extensive upgrading and improved maintenance of much of the existing

dyking system at these farms is undertaken, the dykes will remain prone to failure in several spots and the farms will continue to be susceptible to periodic flood damage. These natural hazards will always exist for buildings and structures situated in such close proximity to the ocean and in the lower floodplain of a river.

Presently completed and future flood control projects sponsored largely by government flood protection agencies will do much to alleviate and possibly eliminate part of the present river flooding problems faced by the farms in Cowichan Bay. These projects are discussed in more detail in Section 4. Generally, however, each farmer owns and is directly responsible for maintaining their dykes in order to provide sufficient flood protection.

Unfortunately, there recently have been breaches of seaward dykes at two of the major Cowichan Bay farms: the large Dinsdale farm to the south and the Doman farm north of the sawmill operated by A. Blackley. In both cases, dyke failure has occurred during severe winter storms at high tide and considerable damage from salt water inundation has resulted.

The portion of the Dinsdale farm affected was for sale at the time and still is. Non-government habitat management organizations at one time expressed interest in acquiring the acreage (43.5 acres) for sale for possible habitat creation projects in the future. However, the present purchase price exceeds the range to which such organizations have restricted themselves in acquiring properties elsewhere for habitat purposes. Although this prospect might be given further consideration, apart from the remnant drainage channel, most of the acreage for sale has good agricultural capability. However, upgrading the existing seaward dyke, particularly at the site where the recent breach was repaired, would have to be undertaken first.

In the case of the Doman/Blackley farm, the seaward portion which received most of the salt water damage from recent dyke failures has been dedicated as a habitat area by Doman. With construction of the new

dyke along the landward edge of the dedicated land, the hazard of either river or tidal flooding to the remaining portion of the farm will be greatly reduced. The land dedication by Doman, being an integral part of the negotiations relating to log storage, has led to the additional benefit of improved flood protection for the remainder of the farm in the process of allowing for creation of more intertidal habitat in the estuary.

Continued and intensified use of existing farms in the Cowichan Bay area would be desirable. In addition to the two farms just discussed, limited agricultural activity continues on land owned by the Hagar's and by Rooke and Rodenbush, as well as on adjacent land within the Cowichan Indian Reserve.

The Rooke and Rodenbush property at one point was a proposed site for a shake and shingle mill but in 1982 was offered for sale. There has been some interest in acquiring the property for habitat purposes, as much of the property is outside the dyking system. However, purchase price also has been an obstacle. Although there might be further consideration given to acquiring some of the present agricultural areas for habitat purposes, it would appear that the majority of these areas can and probably should remain dedicated to agriculture.

2.4 COMMERCIAL

The south side of Cowichan Bay is the focal point for most commercial activity in the area. The major form of commercial activity is associated with either marina and fishing related services or tourist accommodation and hospitality services. A number of residences constructed on piling also form part of the village area of Cowichan Bay. It is anticipated that much of the effort to enhance tourism and expand private or public recreational opportunities in Cowichan Bay will be targeted in the Village area to supplement the charm that already exists there.

3.0 HABITAT MANAGEMENT

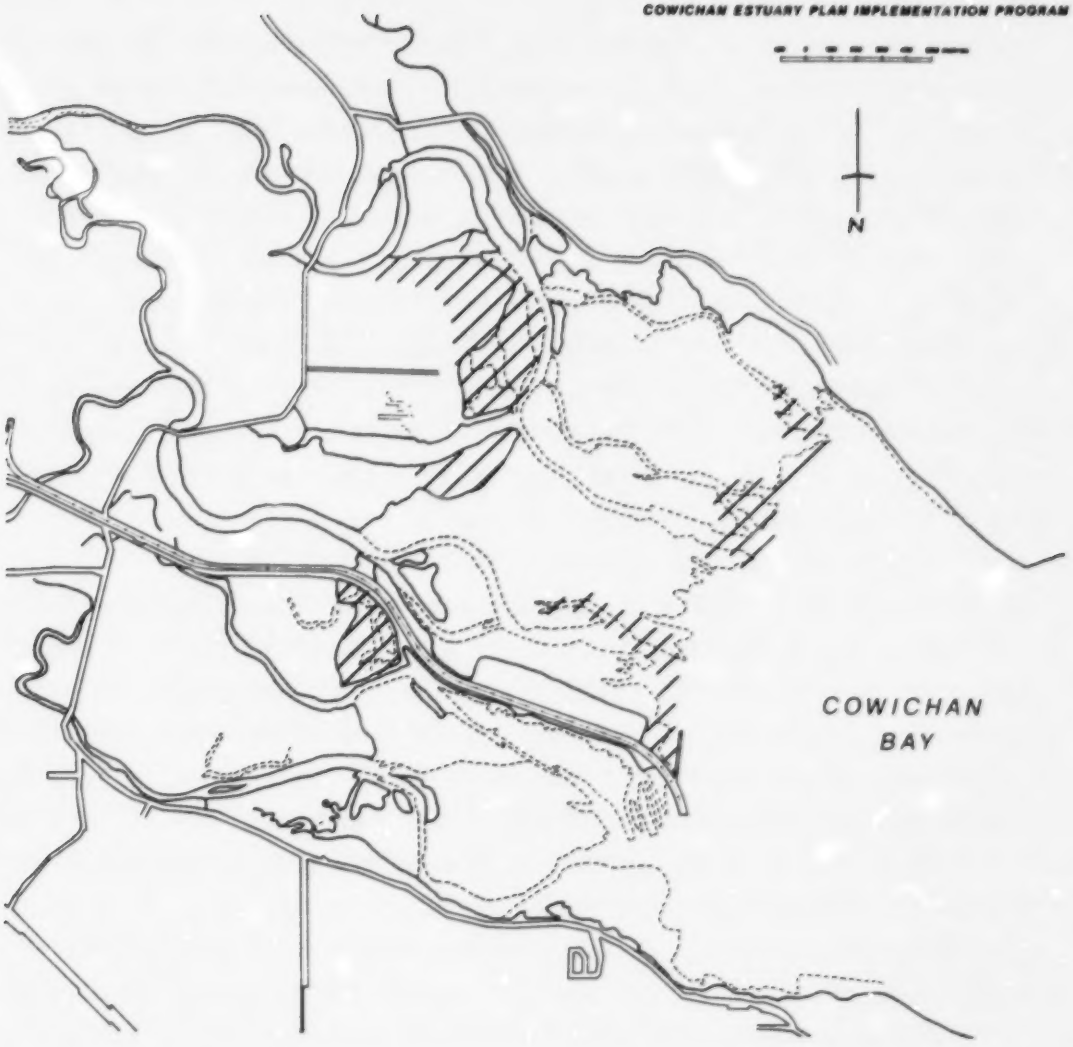
Through removal of habitat or by direct and indirect damage to habitat, each of the various land use activities described in the preceeding section have, to some degree, diminished the original potential and capacity of the estuary to produce or support the various species of fish and wildlife that rely on the existence of quality estuarine habitat at some point in their respective life histories. Being one of the largest estuaries on the British Columbia coast, it has been postulated that there may have been and still could be excess capacity for biological productivity in the estuary. Much more related research would be needed to prove or refute this. Habitat management agencies, in the face of such doubt, often feel it is prudent to err in favour of conserving environmental resources as much as possible.

Modifications to some of the present activities which have been negotiated through the Implementation program, particularly for forest industrial activities, will reduce substantially the amount of previously damaged habitat in the area. Monitoring of the rehabilitation of the disturbed areas and continued research to improve present understanding of the functional relationships between estuarine habitat and certain fish and wildlife species should permit greater certainty in dealing with future land use decisions in the Cowichan Estuary, as well as in other coastal areas. Also, significant potential exists for offsetting some of the past and possible future losses in the estuary's overall biological productivity through habitat enhancement programs. Present habitat management proposals as well as some options for future proposals are discussed in this section and are identified in Figure 3.1.

FIGURE 3.1

Habitat Management Proposals

COWICHAN ESTUARY PLAN IMPLEMENTATION PROGRAM



Habitat Management

3.1 DOMAN DEDICATED LAND

Initial habitat enhancement and management efforts will be focussed on approximately 23 acres of land dedicated from the Doman/Blackley farm. As previously mentioned, the basis of habitat management effort at this site will be controlled inundation of the acquired area by both fresh and saline water once dyke protection for the remainder of the farm has been completed. This could be accomplished by creating breaches in the old dykes at selected points and installing a series of removable weirs at each breach to permit manipulation of fresh water and tidal flows into the area to achieve desired levels of inundation and salinity. Combining this with a network of channels and ponds should promote the development of highly productive habitat for both waterfowl and fish.

It is expected that by increasing water levels and decreasing salinity, growth of marsh vegetation valued as feed for waterfowl (eg. Carex, Scirpus, Ruppia) will be enhanced while less desirable vegetation (eg. Distichylis) will be reduced. Channels to the marine environment will be constructed to increase tidal inundation and provide access to the site for juvenile or small fish. Ponds will be excavated to provide refuge and feeding area for both fish and waterfowl. High ground or mounded areas also will be provided for resting, wintering waterfowl.

These modifications and other habitat enhancement options which may yet be identified for the site have been devised by habitat management personnel in federal and provincial government agencies in cooperation with non-government habitat organizations. In addition to exchanging technical expertise in designing and implementing desired habitat improvements, cost-sharing possibilities have been under consideration by the involved agencies and organizations. Therefore, it can be expected that transformation of the land dedicated by Doman would follow soon after completion of the landward flood protection dyke.

Baseline vegetation studies have been completed which will enable monitoring of the changes resulting from the proposed modifications to the site. A spring bird count also has been completed to permit determination of any increases in waterfowl and other migratory waterfowl use. Wintering bird counts remain to be done. Also a literature search of available research conducted in British Columbia and Washington State will be completed in order to decide on the depths and configurations to be used in constructing the channels and ponds for the site. Once these have been constructed, a program to monitor fish utilization of the new channels and ponds will be undertaken.

In planning the habitat enhancement program for the site, consideration also will be given to allowing for limited access for agricultural purposes. Some of the landward portions of the dedicated land is relatively high ground in close proximity to the new dyke. Certain vegetation suitable for grazing cattle might be cultivated at such spots as shared use of such areas for cattle and waterfowl feeding has been possible elsewhere. This scheme could be adapted at this site providing appropriate measures for containing the movement of cattle is included. Consideration also has been given to relocating some of the soil to be removed for channel and pond excavation to the remaining farm area in order that it can be used to fill in some of the low lying spots in that portion of the farm.

A decision on possible modifications to the existing marsh area outside the present dykes which was dedicated by Doman will probably await completion of the work on the dedicated farm area. The results of fish and bird utilization monitoring and the availability of necessary funding will be important factors in reaching such decisions.

3.2 MARINERS ISLAND

Mariners Island is a small island of public land surrounded by private land. As such, it is only accessible by boat. In order to gain

access from Tzouhalem Road, it is necessary to get permission to cross land in the Cowichan Indian Reserve or land belonging to Doman and also land owned by Rooke and Rodenbush and by CNR. Although some interest has been expressed for developing Mariners Island as a public wildlife viewing area, there are obvious obstacles to such a proposition.

Measures taken by Doman to protect the side of the island abutting on the mill pond and the tip of the island from activities related to operating the sawmill have been described previously. The gradual accumulation of logs along the higher limits of tide on the island has affected the quality of intertidal marsh habitat existing there. Some of the older drift logs have settled into their own depressions in the marsh and can be used by birds for nesting. Others still float and compact or smother marsh vegetation when they come aground. The accumulation of drift logs has become large enough to consider measures for removing all but those that should remain as bird nesting habitat.

Previous log salvage proposals by various firms to recover merchantible logs washed up on the island following storms have been confounded with the problems of removing the wanted logs without causing more damage to the marsh areas than would result by having the logs there and by arranging for acceptable access. Also, either out of concern over possible habitat damage or the desire for all logs to be removed rather than just the merchantible logs, strong local public opposition has been expressed over previous log salvage proposals. Consequently, the proposals have been abandoned.

Further consideration will be given to the habitat management benefits of removing most of the logs accumulated on Mariners Island and to how this might best be achieved. However, it is expected that this will not receive high priority in comparison to other habitat management options for the estuary. For the time being, Doman's commitment to maintain piling protecting the island from log movement and storage for the sawmill has been arranged through the negotiations under the

Implementation Program. Opportunities remain for proposals that may be presented in the future which could serve to enhance the habitat values of Mariners Island.

3.3 CN MARSH

There are approximately 18.5 acres of marsh situated along the southerly bend in the causeway to the Westcan terminal area and contiguous with a portion of the Dinsdale farm. For lack of a better name, the site which is part of Lot 160 has been referred to as the "CN Marsh".

Until recently, the marsh was separated from the intertidal portion of the estuary by a gravel berm dyke. It is believed the dyke was constructed around 1968, but by whom is unknown. During the intervening years, the area developed vegetation characteristic of fresh water marsh habitat and has been used by waterfowl when the water surface is not frozen. In its report, the Cowichan Estuary Task Force recommended that the gravel dyke separating the marsh from the rest of the estuary be breached to restore tidal influx of brackish water and access to marsh by fish. In December, 1982, during a strong winter storm at high tide, wave action produced a large breach in the dyke.

Unfortunately, the desired results of the dyke failure for habitat enhancement also led to dyke failure at one point along the old Dinsdale farm dyke. The resulting inundation of brackish water produced considerable damage to the feed crop and soil in that portion of the Dinsdale farm, as mentioned previously in section 2.3. The Dinsdales requested government assistance to restore the seaward dyke that had previously protected their farm dyke from high tides and wave action. Under the circumstances, there is not any individual or organization responsible for replacing the gravel berm dyke. Replacement of that dyke would also conflict with the habitat management objectives that recently had been met as a result of its failure.

Being owner of a narrow strip of land along the seaward side of the Dinsdale farm dyke, MacMillan Bloedel offered its assistance by providing temporary repairs to the breach in the Dinsdale dyke. The repair work is not considered to be adequate to provide long term protection from further leaks at high tide. It appears that some salt water seepage is still occuring, but it is unknown if this is a pervasive problem along the entire length of the farm dyke or is confined to the repaired section.

Efforts were undertaken through the Implementation Program to investigate the possibility of replacing the seaward gravel berm dyke by including some type of flow control structure which would allow continued tidal inundation only to the point where the Dinsdale farm dyke would not be threatened. The flow control structure would provide the additional benefit of permitting experimental manipulation of water levels and salinity in the marsh area.

The feasibility and costs of such an undertaking were examined by habitat and water management agencies along with other interested organizations. However, the investigation determined that the cost of dyke repair with the flow control structure could be estimated at $100,000. The alternative cost of upgrading the Dinsdale farm dyke would be as much and probably greater. The benefits to habitat enhancement resulting from the project would not be significantly improved over the present situation caused naturally, and may detract from the renewed accessibility of the site for fish. In view of this, the proposal has been abandoned.

In conjunction with the work proposed for the land dedicated by Doman, further research might be conducted to determine the benefits and utilization of low tide refuge areas by fish in locations along the edge of the delta and nearing existing tidal channels. While recent research on Sturgeon Bank in the Fraser River Estuary suggests low tide refuge areas may be very important to rearing salmon, site-specific research is

needed in the Cowichan Estuary to identify possibilities for creating or enhancing existing low tide refuge areas. Such research may also be beneficial to determining possible projects for enhancing eelgrass growth in estuary and other biota associated with eelgrass communities, such as crabs.

Increasing the abundance of shellfish in the estuary and improving shellfish growing conditions could also be considered in the future. The Cowichan Estuary has been closed to shellfish harvesting for public health reasons for many years as a result of excessive levels of fecal contamination. The potentially harmful bacteria that are absorbed into the tissue of shellfish can originate from a variety of sources, including sewage disposal areas and runoff from agricultural areas where livestock are raised. More study will be required relating to the feasibility of mariculture in the estuary and the appropriate measures for reducing and eliminated sources of fecal contamination.

Investigations aimed at improving sewage treatment and disposal in the Duncan-Cowichan Bay area have been continuing with involved local governments and the Cowichan Indian Band for the past several years. Difficulty in deciding what should be done, who is responsible for what and finding necessary funding have hampered progress in this area.

As previously mentioned, future consideration might be given to acquiring additional habitat areas at the Dinsdale farm area and the Rooke and Rodenbush farm which presently are for sale. Restoring tidal flow in the old drainage channel blocked by Khenipsen Road also has been suggested for future consideration. Over the next several years, habitat management and enhancement proposals may be presented by interested public groups, volunteer programs, or educational organizations; as well as by established habitat organizations and government agencies.

Habitat management activity at the CN Marsh site in the short term will be limited to monitoring the evolution of the site's ecology from a

fresh water marsh back to a brackish water marsh. This should add valuable knowledge about the ecological processes occurring under such circumstances. Depending on the results of the work undertaken on the land dedicated by Doman, similar habitat enhancement modifications might be considered for the CN Marsh site. In that event, given the funding and effort involved, it is anticipated that a request will be made to CNR by the sponsoring organization to obtain tenure over the habitat area.

3.4 MONITORING, RESEARCH AND FUTURE CONSIDERATIONS

Fisheries and Oceans Canada has indicated commitment to monitoring the rehabilitation of the habitat areas which will no longer be used for log storage in the estuary. More site-specific data on the conditions occurring at remaining log storage sites which may be affecting fish productivity in the estuary also will be obtained. Combined with the work proposed for the land dedicated by Doman, these activities have high priority. Arrangements for obtaining and sharing the necessary funding and workload are being explored among habitat management agencies and interested non-government organizations, in order that these activities can commence as the negotiated changes in log storage on the estuary take place.

More specifically, Fisheries and Oceans Canada has proposed that over a three year period, a monitoring program to measure changes in benthic invertebrate populations be conducted in sites on the estuary where log storage will remain intensive, where it has been rare, and where intensive log storage will be eliminated. Over the same three year period, sediment quality will be sampled at each of the sites. Changes to eelgrass growth in the estuary also will be monitored over this period, although such changes may not be detectable until somewhat later. Succession in marsh habitat and eelgrass communities can be followed through regular air photography and by estuarine habitat mapping and classification. The latter habitat mapping project has already been planned by the Ministry of Environment.

4.0 FLOOD CONTROL

A series of proposals for a major flood control program along the Cowichan and Koksilah Rivers were presented in the 1980 Cowichan Estuary Task Force report. The flood control proposals were developed over several years in consultation with a large number of concerned government agencies before they were presented in the Task Force report. Even after such consultation, there have been disagreements over some of the proposals ranging from disputes over dyke alignments to measures required to mitigate environmental impacts.

The overall flood control program is ambitious in scale and financially will be very costly. Clearly, implementation of the flood control proposals must be phased over many years. Before each proposal can be implemented, negotiations with affected landowners and involved local, provincial and federal government agencies have to be completed. Following this, specific engineering design work and tendering of contracts can proceed, assuming the funds for the estimated cost of construction can be made available. As the most experienced agency to perform these tasks, the Ministry of Environment's Water Management Branch was designated as the lead agency for flood control at the beginning of the Implementation Program.

Negotiations to determine final alignments, design and construction schedules for flood control dyking often can be laborious and time-consuming. Each individual property owner may have special requirements they want met before they will agree to have a dyke located within their property. Similarly, other government agencies may have conflicting priorities respecting the location and timing for flood control works. Often the need for engineering efficiency and cost control can clash severely with habitat protection requirements or land use plans.

Despite all this, substantial progress has been achieved in implementing the flood control proposals presented in the Task Force report.

A great deal more remains to be done before the flood control program is completed. It can be expected that implementation of the flood control program will be on-going for several more years, with coordination remaining the responsibility of the Rivers Section of the Water Management Branch.

4.1 COWICHAN RIVER

Most of the flood control proposals pertain to the Cowichan River. Aside from the Water Management Branch, the key parties involved are the Cowichan Indian Band, District of North Cowichan, City of Duncan, Fish and Wildlife Branch and Fisheries and Oceans Canada. The following flood control projects have been completed or are expected to be completed in the near future. Figure 4.1 displays the Task Force proposals.

In early 1983, the Ministry of Environment allocated a total of $1 million over two years for flood protection works on both sides of the Cowichan River near the Island Highway Bridge (Silver Bridge). The funding was to be split between the District of North Cowichan and the City of Duncan, each of which were to put up 25% of the provin-cial funds. The District of North Cowichan was first to accept the offer. By the end of the 1983 construction season, upgrading and extension of the existing dyke along the south side of the Cowichan River had been completed up to the boundary of the Cowichan Indian Reserve.

In designing and constructing the dyking project, efforts were made to retain or replant as much streamside vegetation as practical along with other habitat management recommendations. Not all the recommendations could be implemented; however, many were. These measures had been developed in consultation with the federal and provincial habitat agencies. Despite periodic differences, such consultations eventually have produced positive results through mutual compromise.

FIGURE 4.1

FLOOD CONTROL PROPOSALS

To assist in this process, a report was prepared by J. E. Burns of the Implementation Program during 1982 on habitat management measures that could be considered in designing and implementing the Cowichan River flood control proposals. The report, entitled "Some Habitat Management Suggestions for Possible Integration With Lower Cowichan River Flood Control", September, 1982, incorporated several fish habitat enhancement proposals developed by Mr. Burns and discussed with habitat and dyking agencies and the Cowichan Indian Band. While it may not be possible to obtain agreement on all of the habitat management suggestions, the report has served as a useful guide. The report should aid in the design of future flood control works by pointing to habitat concerns and possible means for accounting for them in project construction.

The flood control works on the north side of the Cowichan River within the City of Duncan will be undertaken during 1984, provided funding is available from the Ministry of Environment and the City of Duncan agrees to proceed. However, problems have been encountered in finalizing arrangements for the project. The City of Duncan has some uncertainty about finding its share of the necessary funding. Moreover, difficult conflicts have developed in relation to alignment of the dyke. The City of Duncan disagrees with the set-back dyke alignment proposed in the Task Force report and supported by habitat agencies because the City has several private and public property concerns. The habitat agencies oppose Duncan's preference for the existing dyke alignment because this would cut off many important side-channels and fish habitat areas. The Water Management Branch has been attempting to obtain agreement on the alignment.

Implementation of set-back dyking proposed by the Task Force by Somenos Creek is not possible yet due to lack of funding. Some improvements to flooding problems around the Somenos Creek area have occurred as a result of ARDSA funding provided to improve agricultural drainage in the area. The funding has been used for dredging a deeper

channel for Somenos Creek. Because gravel has gradually built up the bottom of the Cowichan River at the confluence with Somenos Creek, the excavation of a new channel through the lower end of Major Jimmy's Slough was proposed by the Task Force which would result in a lower streambed elevation at the Somenos confluence. Despite the dredging of Somenos Creek and recent gravel removal from the Cowichan River for dyke construction in the Cowichan Indian Reserve, the need for implementing the channel excavation proposal or some alternative still remains. This will permit more time for solving some of the problems associated with the proposal, including further consideration of possible alternatives.

The Task Force was unable to complete the development of specific proposals with the Cowichan Indian Band for flood control along the lower reaches of the river passing through the Indian Reserve. However, the Water Management Branch has frequently consulted with the Indian Band and offered advice relating to Band Council proposals for flood control. During 1982 and 1983 construction seasons, the Cowichan Indian Band constructed an important set-back dyke to provide protection from flooding of the North Fork of the Cowichan River. In using gravel from the streambed of North Fork, part of the gravel accumulation problem and its contribution to annual flooding in the area also was alleviated.

A flow control structure to ensure a 2:1 flow ratio between the North and South Forks, respectively, has been suggested to the Indian Band by the Water Management Branch. The Band needs to acquire additional funding to construct the flow control structure at the North and South Forks bifurcation. The bifurcation structure and settling pond should resolve much of the flooding problem in this area.

It is anticipated that the fruitful consultations between the Cowichan Indian Band and Water Management Branch will continue for other flood control works being considered within the Indian Reserve.

Completion of the bifurcation flow control structure and excavation of a gravel settling basin in the North Fork have been given priority attention.

Another high priority is the construction of the new dyke along the landward edge of the farm area dedicated by Doman. Until necessary funding can be found for the dyke construction, the habitat management proposals for the site described in section 3.1 cannot proceed.

More work and additional funding will be required over several years to complete implementing the other Task Force proposals for flood control along the Cowichan River system. As some of the proposals are constructed, the determination of priorities for implementing other remaining proposals or reconsidering their necessity should become easier.

4.2 KOKSILAH RIVER

The additional engineering analysis required to reach a decision regarding implementation of the Koksilah River diversion proposal by the Task Force or the alternative proposal for deepening the existing channel south of the CN railway line has not been completed. With the completion of the Island Highway widening and construction of the new bridge, greater attention may be given to raising the elevation of the Cowichan Bay Road proposed by the Task Force. It might be easier to alleviate flooding problems in areas south of Cowichan Bay Road by pursuing this proposal more immediately than the others proposed by the Task Force.

Since release of the Task Force report, increased rip-rap protection has been provided along the Koksilah River near the Cowichan Bay Lawn Tennis Club property and the Dinsdale farm. However, most dyke work along the river has been in response to repair needs. The proposed dyke surrounding the Clemclemulitz Village area has been partially

constructed along the Koksilah River channel draining into the South Fork of the Cowichan River.

The Task Force recommended measures aimed at increasing fresh water flow and distribution to the estuary area south of the causeway to the Westcan terminal. Flow diversion structures to direct greater flow down the middle and south forks of the Koksilah have been viewed by Water Management Branch engineers as presenting other flood problem possibilities. Also, if it is decided to proceed with the proposal, it is expected that acquiring necessary funding for the proposed diversions, will take several years. Propositions for placing a large culvert under the causeway to direct flow from the north side to the south side were greeted with considerable resistance from CNR and MacMillan Bloedel. Investigations by Fisheries and Oceans Canada concluded that diverting greater fresh water flow to the south side of the estuary would be of questionable benefit. Further consideration of the proposal has not been pursued.

For the most part, little progress in implementing flood control proposals for the Koksilah River has occurred compared with advances made along the Cowichan River. The fact that flood control works along the Cowichan River are providing protection for more densely populated areas is one factor supporting the allocation of funding for those projects ahead of pro-posals for the Koksilah River. However, it is recommended that increased effort be given to alleviating some of the flooding problems along the Koksilah River system.

5.0 ENVIRONMENTAL MANAGEMENT PLAN

The preceeding sections of this report have described at length the negotiations, effort and rationale involved in developing a broadly acceptable plan for use of the Cowichan Estuary. This section presents an overview plan of land use activities which will continue for various portions of the estuary and further steps to be taken for implementing the plan are described as follows. A flexible process for reviewing future proposals or changes in land use activities and procedures for re-evaluating and amending the plan also are described.

5.1 AREA DESIGNATIONS

Figure 5.1 distinguishes the various types of continued activities in the estuary and their locations. These have been divided into four general categories or area designations: Industrial/Commercial, Agriculture, Habitat Management and Conservation/Recreation.

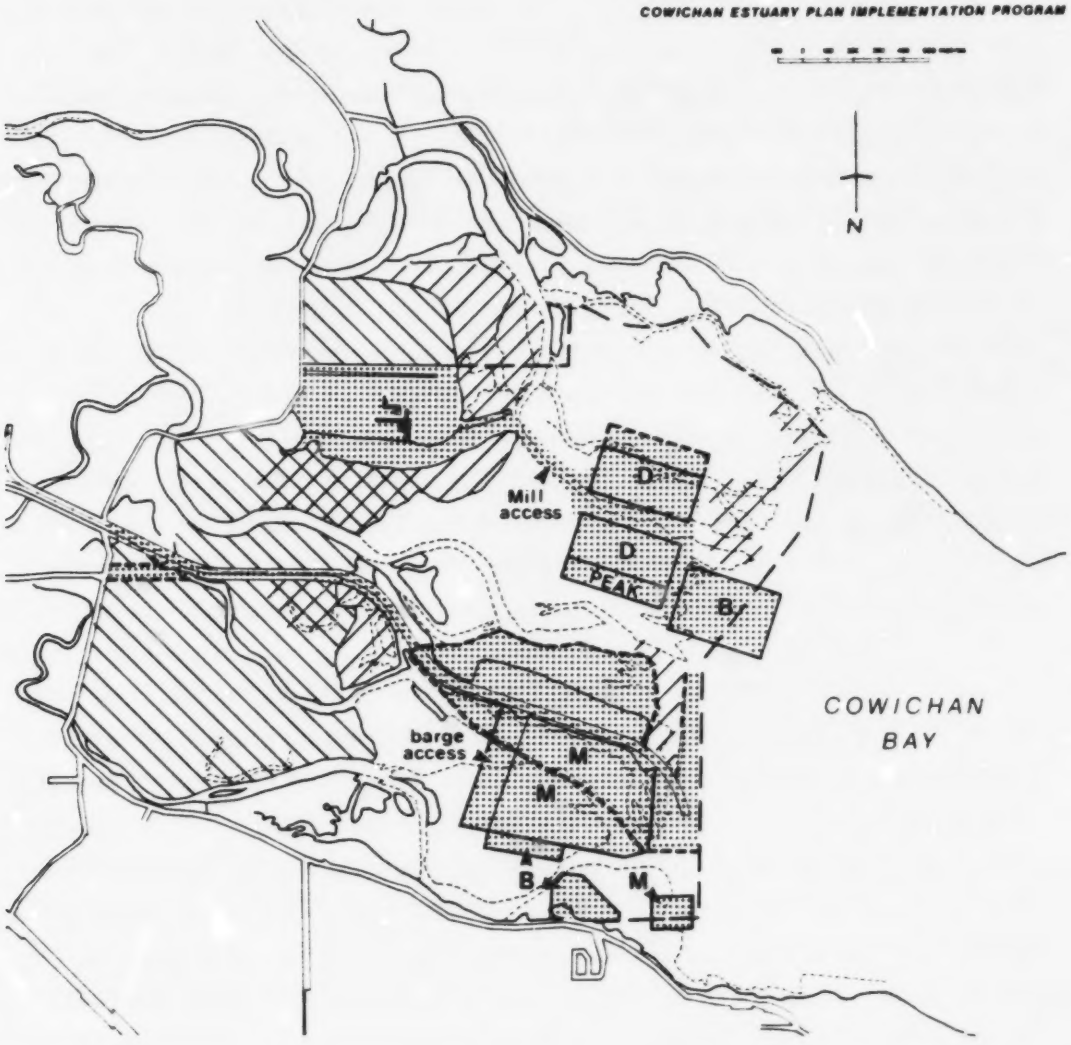
INDUSTRIAL/COMMERCIAL designation signifies those activities that have been described in Section 2.0 as Forest Industrial, Port Industrial and Commercial. Subject to necessary regulation, such as waste management regulations, it is intended that areas of the estuary so designated will be dedicated to the full or optimal development of each of these activities. This also will be the case for activities associated with each other designation.

HABITAT MANAGEMENT designation indicates the areas where major undertakings relating to habitat enhancement have been proposed. However, some of the other habitat management activities described in Section 3 may occur in areas designated as CONSERVATION/RECREATION or overlap with areas designated as AGRICULTURE. Clearly, some overlap of the various activities from different designations will occur. In the case of industrial activity, such overlap will be infrequent, whereas activities associated with Habitat Management and Conservation/ Recreation will constantly overlap.

FIGURE 5.1

Area Designations

COWICHAN ESTUARY PLAN IMPLEMENTATION PROGRAM



- Industrial / Commercial
- Agriculture
- Habitat Management
- Possible Mixed Use
- Conservation / Recreation
- Log Storage
  - D Doman
  - M MB
  - B BCFP
- Potential Expansion
- Lot 160 Boundary

5.2 IMPLEMENTATION

1. AGREEMENTS

The first steps for implementing the plan will entail those actions specified in the negotiated agreements with each of the major companies. In some cases, this will require the expenditure of capital to relocate present log storage areas or modify existing operations. By contrast, modification of the present CNR leases should be readily accomplished. Other changes, such as port expansion, might remain pending indefinitely. However, most of these changes are expected to be implemented by the end of 1984.

2. PLANS AND BY-LAWS

Another stage in the plan implementation will involve the application of plans and by-laws by the Cowichan Valley Regional District and the District of North Cowichan as empowered under the Municipal Act. CVRD and North Cowichan have been cooperating with each other in preparing their respective plans and the Cowichan Bay Settlement Plan. It is anticipated that the Cowichan Bay Settlement Plan will reflect and support the activities described in this environmental management plan, although there may be more detailed discussion of various activities in the Settlement Plan involving the estuary as with other areas included in the Settlement Plan. Similarly, this environmental management plan should facilitate enactment of zoning by-laws, where required, by resolving past disputes or uncertainties that have precluded the application of zoning by-laws.

3. SENIOR GOVERNMENT RESPONSIBILITIES

As with local and regional governments, this environmental management plan will be implemented and supported by cooperating senior government agencies in the administration of their respective regulatory

responsibilities or the provision of government services. Conflicts may occur periodically. However, the plan should provide the necessary context within which to resolve any future conflicts satisfactorily.

4. COWICHAN INDIAN RESERVE

This plan may, in some respects, directly or indirectly affect land and activities within the Cowichan Indian Reserve. The Band Council has been consulted at times throughout the Implementation Program. There never has been any intention to regulate or pre-empt activities within the Indian Reserve. However, it is hoped that existing and future cooperation between the various government agencies and the Cowichan Indian Band will result in their respective activities remaining compatible.

5. ENVIRONMENT MANAGEMENT ACT

In order to ensure consistency and coordination of actions by provincial agencies, it is proposed that a Cabinet Order be issued under the Environment Management Act requiring compliance with the plan and with various modifications of activities specified in the negotiated agree-ments. The Environment Management Act empowers the Minister of Environment to prepare an environmental management plan to be submitted for approval by the Provincial Cabinet. As this environmental management plan essentially reflects measures achieved through negotiation and committed under written agreements, it is reasonable to expect that Cabinet may consider approval of the plan. In order to provide formal approval and for the purposes of implementing the environmental management plan, Cabinet is empowered to issue an Order-in-Council requiring compliance with the approved plan and nullifying the effect of any contrary action taken under or empowered by other provincial statutes. Therefore, a Cabinet Order will enforce compliance with the plan by provincial agencies or provincially empowered authorities.

In cases involving substantial contravention of the approved environmental management plan by a particular individual or organization, and if the actions involved can be reasonably expected to produce significant detrimental environmental impacts, the Ministry of Environment may issue an Environmental Protection Order. However, the use of an Environmental Protection Order, which can be extended as long as needed by Cabinet, should not be necessary in the Cowichan Estuary.

5.3 PROPOSAL REVIEW PROCESS

Occasionally, new projects will be proposed in the future. While some proposals might be anticipated in relation to present activities in the estuary, other proposals may be presented for undertakings or activities which cannot be foreseen at this time or in the near future. A process is needed whereby such proposals can be reviewed to determine if there will be adverse environmental impacts and to evaluate any consequences relating to the plan and land use in the estuary.

A process for reviewing proposals has been in place for the Cowichan Estuary since 1977 under Order-in-Council 3339. The Order requires that every proposed project be subject to environmental impact assessment (EIA) and be approved by the Ministry of Environment before it can proceed. The EIA process under the Order has worked well in ensuring that adequate provisions for environmental protection have been incorporated before proposed activities proceed. However, the mandatory nature of the process has meant that even minor activities as replacing existing piling have had to be submitted and reviewed. With implementation of the negotiated agreements and other elements of the plan for the estuary, a mandatory EIA process, such as Order-in-Council 3339, is no longer appropriate.

Rather, it is proposed that Order-in-Council 3339 be replaced with a new review process which is linked with the plan. It also is recommended that the new review process be included in the proposed Cabinet

Order under the Environment Management Act and be put into effect along with the environmental management plan.

The new review process will be quite similar to the existing process under Order-in-Council 3339, except that it will be applied only when necessary instead of being automatically applicable to everything. As long as activities are occurring in a manner consistent with the relevant designations, new proposals within those designations may not require review under the process. It is only when a proposal would appear to involve significant environmental impact or is not consistent with the plan that the new review process would be applied.

The following examples illustrate the manner in which the criteria of potential environmental impact and consistency with plan designations can be applied to determine which proposal would require review. Installation by BCFP of the can buoys and anchor system for full use of its deep water storage area would not require review under the new process. Similarly, installation of the bundle-lift system at the Doman sawmill, being consistent with the activities under the Industrial/ Commercial designation, also would not require review under the new process. On the other hand, substantial modifications to the Doman access channel would be subject to review under the new process, even though channel modifications would be consistent with the Industrial/ Commercial designation. This is because modifications to the access channel may produce significant changes elsewhere in the estuary, perhaps adversely affecting habitat enhancement areas nearby.

In order for it to work effectively, it will be necessary that notification of a proposal be provided even if it is unlikely review would be required. Therefore, a regular point of contact will be established to receive notification and enquiries and to generally administer the review process. Since there is statutory authority for such a process under the Environment Management Act, it is intended that the proposed review process will be carried out under the auspices of the Deputy Minister of Environment, as has been the case for Order-in-Council 3339.

It also will be necessary that the process provide adequate consultation with other government agencies and with those who are accountable for the results of decisions reached through the review process. The Environmental Assessment Committee approach used for Order-in-Council 3339 has been largely successful in this respect. Agencies such as Fisheries and Oceans Canada and the Cowichan Valley Regional District have in the past provided a high standard of technical expertise and advice through representation on the Environmental Assessment Committee. However, each was unrestricted by such participation in subsequently setting out more specific actions required under their respective jurisdiction but not included in Order-in-Council 3339 decisions.

It is anticipated that such an arrangement would continue to be effective and satisfactory under the new review process. Also, it has been suggested that CNR participate with review committee established for proposals requiring use of CNR land in Lot 160. Likewise, other representation as appropriate would be arranged to suit the particular elements of each given proposal.

Discretion will be required in the application of the review process. The basis for deciding whether or not a proposal should be subject to review may not always be as clear as the examples presented above. In such situations, the judgement of the Ministry of Environment official administering the process and that of the agencies regularly consulted in the review process would be required. This might include consultation with interested public groups, such as the Cowichan Estuary Preservation Society. If a dispute should arise, it should be possible to resolve it in the context of the plan. However, existing recourse to appeals at the political level of government would still be available, under the rare circumstance that such action becomes necessary.

5.4 PLAN AMENDMENT

It is expected that amendment of the environmental management plan for the Cowichan Estuary will not be required in the foreseeable future.

All of the effort to date in developing the plan and the measures proposed for implementing and administering the plan should limit the likelihood of circumstances arising which require plan amendment. However, there must be flexibility to account for unforeseen changes in the future and to ensure that a rational and broadly acceptable approach to use of the estuary can continue.

To provide a hypothetical example, consider the possibility that one of the forest companies chooses to modify its present operations and thereby would no longer require its log dump and storage facilities in the estuary. It could be that several other forest companies or a group of independent loggers will be lined up for the opportunity to occupy the vacated site. Continued use of the site for log storage and dumping would be consistent with the plan and, given a demand for such facilities, should be encouraged. Conversely, the company's departure from the estuary might be linked to larger trends in the forest industry and the demand for continued use of the vacated site for log handling might not exist as a result. If so, consideration should be given to alternative use of the site.

There also is the possibility that the results of the proposed monitoring program or future research will lead to the need for additional habitat management proposals in order to provide greater enhancement of the estuary's productivity.

If a situation such as these examples should develop, a procedure for amending the plan will be required. Assuming that the Cabinet Order is issued for implementing the plan, amending the plan would require Cabinet approval. Such an arrangement should not be viewed as unwieldly, given a commitment to the principles underlying the environmental management plan.

In the event that a situation requiring plan amendment does arise, it is proposed that an evaluation of all the options and consequences

involved be coordinated by the Ministry of Environment, in close consultation with the concerned public, affected landowners, and the various government agencies. Following the development of either an acceptable plan amendment proposal or a number of options for plan amendment as a result of the consultation and evaluation period, the proposed amendment would be submitted to Cabinet for approval and issuance of the necessary Cabinet Order.

ADDITIONAL BACKGROUND INFORMATION

The following references may be helpful to those readers seeking additional historical, background or technical information:

1. Cowichan Estuary Task Force Report, 1980. Environment and Land Use Committee Secretariat. (This report is now out of print. The main report and three volumes of appendices have been distributed to public libraries in Duncan, Victoria, Vancouver, to B.C. Universities, and also may be viewed at the Ministry of Environment library in Victoria).

2. Effects of Estuarine Log Storage on Juvenile Salmon, 1983. D.A. Levy, T.G. Northcote, R.M. Barr. Westwater Research Centre Technical Report No. 26 ($6.95. May be found at some libraries).

3. Some Habitat Management Suggestions for Possible Integration with Lower Cowichan River Flood Control, 1982. J.E. Bains, Cowichan Estuary Plan Implementation, Ministry of Environment. (Limited availability upon written request to: Planning and Assessment Branch, Ministry of Environment, Parliament Buildings, Victoria, V8V 1X5).

4. Cowichan Estuary Doman Property Land Acquisition Options: A Discussion Paper, 1983. D. Morrison, M. Wayne, A. MCKenzie, R. Hunter, Ministry of Environment. (Limited availability upon written request to above address).

5. Update (newsletter), Cowichan Estuary Plan Implementation, Number I (1981) and Number 2 (1982). Ministry of Environment. (Limited availability upon written request to above address).

POOR

QUALITY

ORIGINAL